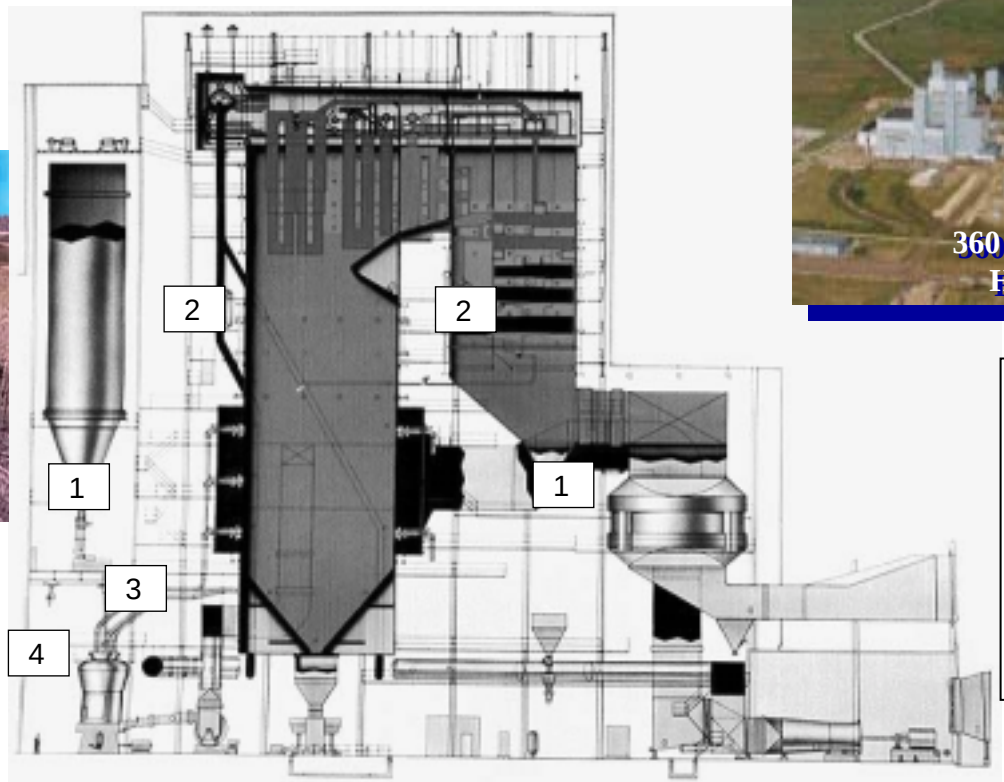
Sunflower Electric Power Company

- A 360 MWe demonstration of an Integrated Combustion Optimization System on a PC wall-fired boiler using Powder River Basin (PRB) coal.
- This technology has potential to significantly reduce NOx emissions while simultaneously increasing power output.
- Total Project funding: $5.9 million ($2.8 million DOE).



LEGEND
1 Low NOx burners
2 Separated over-fire with ports
3 ETC probes
4 Coal flow controls
Neural controls – not shown (located plant control tower adjacent to boiler room)

A PPII Clean Coal Project

Background

- **Sunflower Electric Power Company will test an Integrated Combustion Optimization System on an opposed-wall configuration PC boiler.**
  - System includes: burner design modifications, SOFA, in furnace sensors, coal flow measuring and control devices, and supervisory software.
- **Location: Sunflower's 360 MWe Holcomb Station, Unit 1, Garden City, KS.**
- **Team member: GE Energy and Environmental Research (GE EER), who will provide core technologies being demonstrated at Holcomb Station.**
- **This project will demonstrate how new technologies can simultaneously reduce air emissions and save costs for ratepayers.**

Technology Uniqueness

- **By integrating a unique combination of high-tech modifications and sophisticated control systems, boiler optimization can achieve:**
  - NOx reductions comparable to Selective Catalytic Reduction (SCR) at 20% to 40% less cost using simple retrofit, increased boiler efficiency, and using no ammonia.
  - Reduced NOx emissions from 0.15 to 0.22 lb/million Btu.
  - An improved heat rate, reduced slagging con-ditions, and increased power output (by 7 MW).
- **Total NOx emissions at Holcomb Station are estimated to decrease by about 50%.**

Schedule

- **Project Start**
  - 10/01/2002
- **NEPA Process**
  - FONSI signed 3/11/2003
- **Design**
  - Process Design completed 10/01/2002
- **Construction**
  - Sensor Upgrade Construction started 2/18/2003
- **Commissioning & Startup**
  - Boiler Sensor Integration 2nd Shakedown Complete 6/13/2003
- **Testing**
  - Low NOx Burners 10/1/2002 – 8/29/2003
- **Project Completion**
  - 07/01/2005

Advanced Low-NOx Burner –48" Outside Diameter

Potential Benefits

- **Annual operating costs are not expected to be any higher than the cost of currently installed technology.**
  - Comparative capital costs for SCR are four to five times higher
- **Successful commercial application of this system could reduce NOx emissions in the U.S. by 45,670 tons per year.**
  - Installation forecast: 8.4 GW of existing coal-fired capacity
- **As much as $252 million to $674 million could be saved, compared to SCR installation, by power companies needing to achieve low-NOx control.**
- **Technology should consistently achieve nearly same NOx reductions as SCR, in a simple retrofit, and consistently meet most stringent emission limits set by federal and state New Source Performance Standards.**

Benefits Analysis www.NETL.DOE.GOV/coalpower/CCPI/Index.html